APPENDIX 1-5: Label Clarifications from the Malathion

A commitment letter for adjustment of labeled uses and labeled rates has not been submitted by the primary malathion registrant but documents clarifying the usage and intention of labeled uses (submission dated February 26, 2015) and identifying Federal entities using malathion (letter dated October 9, 2015) have been submitted. These documents have been used to inform the modeling of exposure from specific uses of malathion. A commitment letter was anticipated before the assessment is completed. The assessment has proceeded under the assumption that the discussed label clarifications would eventually be adopted as commitments. A commitment letter on the discussed uses may be anticipated during the public comment period. Any uses unaddressed in a commitment letter will be assessed fully after the public comment period. The specific uses and modifications are described below. The submissions are appended following the use specific modifications.

1) Cull pile uses are only supported by the primary registrant at the request of USDA-APHIS for quarantine pest eradication/suppression programs. Further, the primary registrant has agreed to limit the cull pile use to only these programs. These Federally sponsored programs undergo consultations with USFWS and/or NMFS separate from the consultation on all other uses of malathion.
2) Pine seed orchard uses are only supported by the primary registrant at the request of USDA Forest Service. Spatial coverage of pine seed orchards is discussed in the final attachment to this appendix and includes the range of slash pine in the United States with National Forests and National Wildlife Refuges removed. HUCs 3, 8, and 12 are assessed based on spatial coverage discussed.
3) Fence Row/Hedge Row use is restricted to non-agricultural areas only.
4) Agricultural, uncultivated areas is spatially considered through the already assessed land cover classes of Corn, Cotton, Orchard/Vineyard, Other Crop, Other Grain, Other Row Crop, Vegetable/Ground Fruit, and Wheat. Furthermore, the rate is conservatively assessed as maximum rates for crops in every land cover class are exceeded by the use rate for uncultivated areas.

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Delivered via Electronic Mail

October 9, 2015

Ms. Avivah Jacob
Team Leader, Risk Management Implementation Branch III (RMIB3)
Pesticide Re-Evaluation Division
Office of Pesticide Programs
U.S. Environmental Protection Agency
c/o Document Processing Desk (7504P)
One Potomac Yard, Room S4900
2777 S. Crystal Drive
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Re: Cheminova's Replies to EPA's April 15, 2015, request for Clarifications of Certain Malathion Uses

Dear. Ms. Jacob

On behalf of Cheminova A/S (Cheminova; EPA Company No. 4787), I am writing to respond to EPA's April 14, 2015, response to Cheminova's Clarifications of Non-Agricultural Use Sites for malathion.

To date, Cheminova has submitted nine documents to EPA identifying the use patterns that we are supporting for risk assessments to be conducted during registration review and under the Endangered Species Act (ESA)[1]. Presumably after reviewing these documents, the

[1] Cheminova notified EPA via the following documents:

1. Cheminova's September 15, 2008, Comments on the National Marine Fisheries Service Biological Opinion on potential to affect salmon in the Pacific Northwest. Submitted to Docket ID No.: EPA-HW-OPP-2008-0654.
2. Cheminova's August 24, 2009, letter providing initial comments on EPA's problem formulation document for registration review. Submitted to Docket ID: EPA-HQ-OPP-2009-0317.
3. Cheminova's November 9, 2009, letter providing a draft protocol for conducting a National Endangered Species Assessment for Malathion in agricultural crops and select non-crop uses. Submitted to Docket No.: EPA-HQ-2009-0317.
4. Cheminova's September 6, 2013, comments on EPA's malathion effects determination for the California Red-legged frog (MRID 49211701).
5. Cheminova's September 6, 2015, refined effects determination for the California Red-legged frog (MRID 49211702).
6. An e-mail from Paul Whatling (Cheminova) to Eric Miederhoff (EPA), dated February 28, 2014, providing a master label for malathion in which we reiterated that we support the use patterns in the 2009 RED.

Agency's Environmental Fate and Effects Division (EFED) developed a set of questions concerning a number of malathion uses (primarily non-agricultural) to better define relevant use scenarios for modeling purposes. Cheminova received these clarifying questions from EPA via e-mails on June 3, 2014, September 14, 2014, November 20, 2014, and November 24, 2014. On February 26, 2015, Cheminova submitted a document providing detailed responses to the EPA e-mails including identifying potential label changes. On April 16, 2015, Cheminova received an e-mail from EPA's Eric Miederhoff providing a response from the Agency (dated April 14, 2015) requesting additional clarifications and commitments from Cheminova concerning certain agricultural and non-agricultural uses of malathion. In the text below, we provide EPA's responses and requests followed by our reply.

EPA's Response: Cheminova responded that they do not support the cull piles or larvicide uses (larvicide was not supported at the time of RED). **EPA will look at which labels retain these uses, contact their respective registrants and direct them to remove the uses through the 6(f) process and a label amendment.**

Cheminova's Reply: Cheminova confirms that it is not supporting the mosquito larvicide uses and supports the Agency's action to remove the use from labels. As for cull piles, a subsequent discussion with USDA-APHIS has identified this use as being important to the quarantine pest eradication/suppression programs. Thus, we are willing to work with USDA and EPA to develop appropriate label language to limit the cull pile use to the quarantine pest eradication/suppression programs.

EPA's Response: Agricultural, Uncultivated areas - **EPA requests that Cheminova make label changes connecting use solely to the Federal Programs that they say are the exclusive market for this use. Label amendments can be structured similar to how the Boll Weevil program is represented on labels currently, by creating a state and federal programs-only box. EPA requests that Cheminova make these label changes and document them in a commitment letter.**

Cheminova's Reply: Cheminova agrees to work with EPA to modify labels to limit this use to programs sponsored or administered by Federal or State governments/agencies. The language

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7. Cheminova's May 30, 2014, comments on EPA's preliminary problem formulation for the registration review of malathion. (MRID 49400601).
8. Cheminova's October 21, 2014, problem formulation for malathion ecological risk assessment under FIFRA (MRID 49499901).
9. Cheminova's August 6, 2015, comments on EPA's malathion effects determination for the delta smelt and California Tiger Salamander (MRID 49692201).

should not in any way limit the use on pastures and rangeland and agricultural rights of way, and it should in no way limit the public health mosquito adulticide use.

EPA's Response: Pine Seed Orchards - Cheminova claims that this use is only associated with Forestry Service programs. EFED requested clarification and spatial data from the Forest Service. The Forest Service indicates that this use is primarily in the south: FL, SC, and GA, and that use includes many non-Forest Service orchards. Cheminova had indicated the use was primarily in a different area, and that use was exclusive to Forest Service Programs. **If this use is exclusively by the Forest Service, EPA requests that Cheminova amend the labels to associate this use solely with Forest Service programs and document this change in a commitment letter.**

Cheminova's Reply: Cheminova is only supporting the use of malathion on Pine Seed Orchards in order to meet the needs of programs administered or supported by the US Forest Service. We agree to work with EPA to develop appropriate label language to reflect this decision.

EPA's Response: Household/domestic dwellings (perimeter outdoor only) – Cheminova suggested defining the area to be treated: a 2-foot band around the perimeter of buildings and up to 2 feet on wall surfaces. **EPA requests that Cheminova make these label changes and document them in a commitment letter.**

Cheminova's Reply: Cheminova agrees to define the area to be treated as a 2 foot wide band around the perimeter of buildings and up to 2 feet on wall surfaces. We note that Cheminova does not have labels registered for this use; these uses appear on labels registered by our customers. Nonetheless, we agree to work with EPA to develop appropriate label language to reflect our decision.

EPA's Response: Fencerows/hedgerows – Current labels mention this use in Ag and non-ag sections, and have corresponding higher and lower application rates. **EPA requests that Cheminova clarify as to whether this use is intended for non-ag sites only. If so, EPA requests that they prohibit the Ag labels from using malathion on fencerows/hedgerows (e.g., restrict to residential settings only) and document this change in a commitment letter.**

Cheminova's Reply: Cheminova agrees to restrict the use on fencerows and hedgerows to non-agricultural settings only. The exception is for programs administered or sponsored by the Federal or State governments/agencies. We agree to work with EPA to develop appropriate label language to reflect this decision.

EPA's Response: Intermittently flooded areas – According to Cheminova, this use site is only associated with uses such as rice and the mosquito adulticide use. Uses such as rice, watercress, and as a mosquito adulticide imply that these types of areas will be treated. The risk assessment modeling will account for these areas in connection with these uses. The term may be retained where the label clearly indicates that it is associated with mosquito adulticide use. **EPA requests that Cheminova remove this use term from labels in connection with agricultural uses and document their intent to make this change in a commitment letter.**

Cheminova's Reply: Cheminova proposes to amend agricultural end-use labels to list rice and watercress as the only aquatic food-use crops where malathion applications are permitted. If needed to refine risk assessments, Cheminova is also willing to require a 24-hour holding time before floodwaters may be released after an agricultural treatment of watercress or rice. We are willing to work with EPA to develop appropriate label language to reflect this decision. The language must not limit public health applications of malathion for the control of adult mosquitoes.

EPA's Response: Swamps/marshes/stagnant water - According to Cheminova, this use site is only associated with the mosquito adulticide use. **EPA requests that Cheminova remove this use term from labels in connection with agricultural uses and document this change in a commitment letter.** The term may be retained where the label clearly indicates that it is associated with mosquito adulticide use.

Cheminova's Reply: Cheminova agrees that the use term "Swamps/marshes/stagnant water" should be limited to labels intended for public health mosquito adulticide applications. Therefore, we agree to remove this use term from all agricultural/residential/consumer end-use labels pending receipt of an EPA-approved mosquito control label that includes this use term.

EPA's Response: Non-agricultural rights of way/fencerows & Non-agricultural uncultivated areas/soil – Cheminova replied that these uses are not intended as unique non-ag use sites. They are associated with an ag crop or with Federal Programs. **EPA requests that Cheminova restrict these uses to the listed Federal Programs by stating so on labels. EPA requests that Cheminova document this change in a commitment letter.**

Cheminova's Reply: Cheminova agrees to work with EPA to make appropriate label modifications to limit this use to programs that are administered or sponsored the Federal and State governments or agencies. The modified label language should not in any way limit the use on pastures and rangeland and agricultural rights of way.

EPA's Response: Ornamental and/or shade trees – **EPA requests Cheminova clarify that they wish to keep the commercial nursery use, which we would assess as a broadcast application.**

Cheminova's Reply: Cheminova is supporting the use of malathion on ornamental and/or shade trees in the residential/commercial landscape settings as well as a commercial nursery setting. If needed, we are willing to work with EPA to make appropriate clarifications on labels.

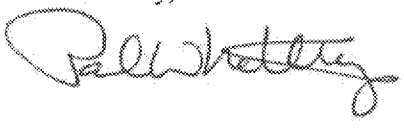
EPA's Response: Ornamental herbaceous & non-flowering plants, ornamental woody shrubs and vines – **EFED will model the Commercial Use.**

Cheminova's Reply: Cheminova is supporting the use of malathion on ornamental herbaceous & non-flowering plants, ornamental woody shrubs and vines in the residential/commercial landscape settings as well as a commercial nursery setting. If needed, we are willing to work with EPA to make appropriate clarifications on labels.

Cheminova understands that the label changes mentioned here will be required after EPA completes its review of malathion in its registration review program. At that time, Cheminova agrees to work with EPA on appropriate label changes related to the uses discussed in this letter.

If you have any questions, or need additional information, please feel free to contact me at 703-373-8885.

Sincerely,



Paul Whatling
Cheminova, Inc.
EPA Agent for Cheminova A/S

c: Kristian Lystbæk, Cheminova A/S
David Menotti, Crowell & Moring, LLP

Volume 1 of 1

Project Title

Cheminova's Response to EPA's Clarifying Questions Regarding Non-Agricultural Use Sites of Malathion

Test Guideline

Not Applicable

Report Date

February 26, 2015

Author

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STATEMENT OF NO CONFIDENTIALITY CLAIMS

No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA § 10(d)(1)(A), (B), or (C).

Company: Cheminova, Inc.

Company Agent: Paul Whatling

Date: Feb 26, 2015

Title: Director, Scientific Affairs

Signature: Paul Whatling

GOOD LABORATORY PRACTICE STATEMENT

The work reported here does not meet the U.S. EPA Good Laboratory Practice requirements as specified in 40 CFR Part 160.

This work is not required to meet the standards of good laboratory practices because it does not meet the definition of a study contained in Part 160.3 as there is no test material or experimentation.

Sponsor/Submitter:

Signature: Paul Whatling Date: Feb 26, 2015

Paul Whatling
Director, Scientific Affairs
Cheminova, Inc.

TABLE OF CONTENTS

1. INTRODUCTION

The following responds to some of the questions received from the Environmental Protection Agency (EPA) over the past several months concerning certain uses of malathion. Generally, the information below responds to the September 17, 2014 e-mail from EPA's Marianne Mannix, and e-mails from EPA's Eric Miederhoff dated June 3, 2014, November 20, 2014, and November 24, 2014.

In preparing these responses, Cheminova has consulted with the American Mosquito Control Association (AMCA) as well as with the United States Department of Agriculture (USDA) and several of our customers that sell malathion into the non-agricultural sector.

2. MATERIALS AND METHODS

In the text below, EPA's questions are reproduced and then followed by Cheminova's response. Additionally, some of EPA's questions are imbedded in the Table 1 beginning on page 26, where we clarify the intended use instructions for many of the non-agricultural use sites. At this time, we thought it would also be beneficial to the Agency to clarify the fruit and vegetable uses that are supported for the homeowner/consumer market (see Table 2 beginning on page 33).

3. RESPONSES

EPA Question: Wide Area Public Health Use (mosquito adulticide)	**Summary Response** (also see full reply)
OPP has estimated usage data based on private pesticide market research for the malathion mosquito adulticide use but these data is not spatially explicit. The data suggest that use occurs primarily in the Southern and Western U.S. Do you possess or are you aware of spatially explicit usage data that can help refine OPP's understanding of where potential use sites may be most likely to occur?	*No comprehensive national spatial data are available at this time* ***(see "spatially explicit use data," below)***
Are there areas or time of the year when malathion is never applied for this use?	*Potentially* ***(see "areas and timing of use," below)***
Without specific information on the mosquito adulticide use EFED[1] will assume that these applications can occur over any land cover type (i.e. residential and non-residential sites). Are there any limitations to the use pattern that would allow OPP to limit where applications must be modeled?	*Broad modeling assumptions of use sites do not properly characterize use* ***(see "limiting modeling to certain use sites," below)***

[1] EPA's Environmental Fate and Effects Division (EFED)

EPA Question: Wide Area Public Health Use (mosquito adulticide)	Summary Response (also see full reply)
In other words, are there areas that cannot or should not receive applications?	*Public health threats preclude having such an exclusion* ***(see "areas that do or do not receive applications," below)***
OPP understands that mosquito adulticide uses are widely variable in application methods. Does the registrant have any information on the size of an area that is treated in a typical application?	*Not at this time* ***(see "size of area treated," below)***
Our understanding is that mosquito control applications typically occur from dusk until dawn during the period of target pest activity. However, we are interested in additional details beyond this assumption. Can you provide detail on whether there are differences between daytime and night application by a mosquito control district, urban vs rural applications, truck vs aerial applications, and about pest species being controlled at cropping practices in a surrounding area (i.e. is this a rice producing region)?	*Not at this time* ***(see "differences in application patterns," below)***
EFED will use spray drift data from existing sources (e.g. SDTF) to model this use pattern, however, if the registrant is aware of additional spray drift data specific to the malathion ULV formulation EFED would consider that information for risk assessment purposes?	*Additional data should be considered* ***(see "spray drift modeling," below)***
As noted above EFED will model the labeled maximum application rate for all use sites including this one, however, if the registrant is aware of any data showing that lower rates are typically applied, the data can be considered in the risk assessment?	*Less than maximum use rates should be considered* ***(see "use rates," below)***

Cheminova response:

Spatially explicit usage data:
This is a generic question relevant to all mosquito adulticides. Cheminova is not aware of spatially explicit usage data for any mosquito adulticide or larvicide. Thus, we have initiated discussions with AMCA, IR-4 Public Health, USDA, and Responsible Industry for a Sound Environment (RISE) to explore ways to address this issue. We have learned that Angela Beehler (Washington State and AMCA) has initiated a new survey to identify the areas of responsibility and adulticide use for Mosquito Control Districts throughout the U.S. From that survey, it is expected that use maps can be generated for each District and adulticide use within each district can be mapped temporally within each area. The information to be gleaned from this work is expected to provide a major advancement in the knowledge about adulticide use that can be applied to the Agency's risk assessments. The timing for completion of this work is uncertain. At minimum, the data most likely will support the fact that there are specific areas and definite times of the year when malathion will not be applied.

We understand that Ms. Beehler has generated a few maps which have been provided to EPA's Susan Jennings, so Ms. Jennings is aware of this work. We understand that Ms. Jennings did not believe these maps were adequate for EPA's needs. We further understand from Ms. Beehler that additional information is being gathered and Cheminova has provided Ms. Beehler with information about where malathion is being used (state/country) based on our internal information. Ms. Beehler has gathered similar information from other registrants/distributors, etc. USDA noted that there were only 26 applications of malathion as an adulticide in California in 2012, in only 5 counties (Colusa, Fresno, Glenn, Los Angeles, and San Joaquin Counties). Additionally, USDA has also advised us that Forest Service use of mosquito control products is minuscule when compared to total use of mosquito adulticides in the US; and that most use is in Region 8.

Areas and timing of use:
This is a generic question relevant to all mosquito adulticides. Malathion is registered for the control of public and veterinary health pests such as adult mosquitoes, biting flies and midges, and filth flies. As with any public/veterinary health pesticide, the location and timing of use is dependent upon local pest pressures as well as the need to reduce transmission of diseases vectored by these pests. Of course, local climatic conditions also dictate where and when mosquito control operations may occur. For example, an adulticide would not be applied in Minnesota, or even most parts of the continental US, in the winter, but may be needed during the winter for some extreme southern reaches of the US where the climate is warmer throughout the year.

Cheminova is aware of the private pesticide market research for malathion mosquito adulticide use. We are also aware of the results of a survey recently conducted by the AMCA at the request of EPA. Based on this information, and our own commercial information, we agree with EPA that malathion is primarily being used in the Southern and Western U.S.

While malathion may not be routinely used in some parts of the country, the possibility to use malathion must be maintained in order to address potential future public health threats as well as for resistance management – particularly as a rotation chemistry for pyrethroids which have been showing growing resistance problems in many parts of North America and throughout the world. Resistance management is an integral part of mosquito control programs, and as such, it is unlikely that a single registered product such as malathion, or two products in the same chemical family, would be used intensively and repeatedly in a seasonal control program.

Limiting modeling to certain use sites:
This is a generic question relevant to all mosquito adulticides. The Agency must consult with the AMCA, IR-4, Centers for Disease Control and Prevention (CDC) and the United States Armed Forces Pest Management Board (USAFPMB) to determine if use site limitations are possible without undermining the ability of program managers to protect public health.

The AMCA has a position on this issue [2]:

"Regulations and policies for federal lands management vary greatly across federal

[2] http://www.mosquito.org/mosquito-control-on-federal-lands-position-paper-2014

agencies, or even within an agency. Mosquito monitoring and control operations are occasionally prohibited on a federal property – or, if permitted, can only be done in a less than optimal manner, introducing hordes of biting mosquitoes and their myriad problems into surrounding communities. This necessitates wide area insecticide treatments in populated areas where people live, work or recreate rather than focused applications at the source of the problem. Mosquito control programs and federal land managers must work together to control mosquitoes in a practicable, efficacious, cost effective, environmentally compatible manner.

Several potentially lethal diseases such as West Nile virus, eastern or western equine encephalitis, dengue fever, and malaria are transmitted by mosquitoes, but even without any disease transmission large numbers of mosquito bites cause substantive human health problems and medical complications. Controlling mosquito population levels for species of concern is one of the best ways to prevent mosquito-borne diseases. The Centers for Disease Control and Prevention recognizes this human health reality, as do most all local public health authorities.

The unique nature of federal lands necessitates a customized, site-by-site approach that often requires compromise on both sides. To help promote mutual understanding with respect to U.S. Fish and Wildlife Service lands, the AMCA has drafted a guidance document, "Helpful Information to Have or Consider for Mosquito Control on National Wildlife Refuges." This document describes when mosquito control might be needed on many federal refuges and what to consider when making mosquito management decisions. We understand that the mosquito control measures proposed for any federal property must support the natural resources or management goals."

Areas that do or do not receive applications:
This is a generic question relevant to all mosquito adulticides. Most applications are made in residential areas, because their purposes are either to control nuisance mosquitoes or to control mosquitoes that vector human disease. In either case, both categories represent public health uses per EPA's PR Notice 2002-2. EPA should take into account that the vast majority of mosquito control applications are made by professionals working for mosquito control districts, especially when applications are for disease vector control or conditions related to potential disease outbreak. In these circumstances, non-residential areas may be treated but professionals use integrated mosquito management practices and are aware of areas that cannot or should not receive applications.

As noted above, public health threats and their control or prevention require that mosquitocides not be restricted to or from a given use site; however, there are many protective plans in place that should be considered in the risk assessment process. For example, Cheminova is aware of an interim national-level policy from FWS that was published in 2005 for Mosquito Management on National Wildlife Refuges[3]:

> *"When necessary to protect the health of a human, wildlife, or domestic animal population, we will allow management of mosquito populations on National Wildlife Refuge System (Refuge System) lands using effective means that pose the lowest risk to wildlife and habitats.*

[3] **http://www.fws.gov/uploadedFiles/Mosq%20Plan%20Append.pdf**

In summary, the guidance provides for the following:

- *Mosquito management can occur only when local and current monitoring data indicate that refuge-based mosquitoes are contributing to a human, wildlife, or domestic animal health threat.*
- *Refuges may use compatible nonpesticide options to manage mosquito populations that represent persistent threats to health.*
- *Refuges will collaborate with Federal, State, or local public health authorities and vector control agencies to identify refuge-specific health threat categories. These categories will represent increasing levels of health risks, and will be based on monitoring data.*
- *Management decisions for mosquito control will be based on meeting or exceeding predetermined mosquito abundance or disease threshold levels that delimit threat categories.*
- *In the case of officially determined mosquito-borne disease emergencies, we will follow the guidelines described in this document. Monitoring data are still required to ensure that intervention measures are necessary.*
- *All pesticide treatments will follow Service and Department of the Interior pest management and pesticide policies. In an emergency, the pesticide approval process can be expedited.*
- *Refuges must comply with Federal statutes and Service policies by completing the appropriate documentation prior to mosquito management activities taking place."*

We are not aware of a final national policy. There appear to be many other policies like this for individual states and refuges.

Size of areas treated:

This is a generic question relevant to all mosquito adulticides. This question needs to be addressed by the mosquito control industry as a whole. We have engaged in discussions with AMCA, IR-4 and RISE about this issue. We believe that a separate FOCUS meeting involving AMCA, RISE, USAFPMB, adulticide registrants and possibly CDC is necessary to address this question from EPA.

Differences in application patterns:

This is a generic question relevant to all mosquito adulticides. EFED has noted, "Our understanding is that mosquito control applications typically occur from dusk until dawn during the period of target pest activity." However, in general, mosquito control applications are made during the morning and evening crepuscules, not continually throughout the day.

Spray drift modeling:

This is a generic question relevant to all mosquito adulticides. This question needs to be addressed by the mosquito control industry as a whole. We have engaged in discussions with AMCA, IR-4 and RISE about this issue. We believe that a separate FOCUS meeting involving AMCA, RISE, USAFPMB, adulticide registrants and possibly CDC is necessary to address this question from EPA.

Data submitted by the Spray Drift Task Force (SDTF) and EPA's typical use of AgDrift will not accurately or effectively predict drift and deposition from ULV adulticide applications because the studies used to develop AgDrift were conducted using equipment and parameters that reflect agricultural practices, not mosquito control practices. For malathion, we submitted to EPA in 2006 a detailed study under Florida conditions that shows drift and deposition from Fyfanon ULV applications by air and ground (MRID 46963401). This report provides useful information about spray drift and deposition related to the ULV products used for adult mosquito control. This study also compared AGDISP predictions (when parameritized for mosquito control practices) against actual measured deposition from aerial and ground applications. The modeled predictions for aerial applications seemed to provide a good match, but predictions for ground applications were not accurate. If, however, EPA chooses to rely on a drift and deposition model, Cheminova suggests that MULV-Disp be investigated. We are also aware of models used by mosquito control districts that incorporate local weather and wind conditions to predict the behavior of spray plumes and calculate offsets needed to ensure application to targeted areas. Any additional development of models to represent mosquito control practices must be done in consultation with stakeholders involved with mosquito control operations.

Use rates:

For malathion label clarifications, see Table 1, Use 20. As for any pesticide, the malathion label application rate selected depends on local conditions and the sensitivity of target pests to the active ingredient. However, mosquito control practices are quite different from the possible worst case scenarios that EFED models for field or row crops. For adulticides, lower application rates can be used in open fields or semi-open residential use sites, but higher rates may be needed in areas with dense vegetation. Maximum label rates may also be needed if local pest populations are developing resistance to a particular active ingredient.

While malathion mosquito products are labeled for maximum use rates of 0.23 lbs. a.i./A for aerial application and 0.06 lbs. a.i./A for ground applications, the maximum rates are typically applicable to areas with dense foliage or canopies; lower rates are often used in open areas were ground vegetation and the tree canopy are sparse. In addition, Mosquito Control Districts operate on lean budgets and; therefore, strive to use the lowest efficacious rates whenever possible based on their local conditions.

Cheminova's Fyfanon ULV Mosquito label includes use limitations which are summarized in Table 1. These are important to note for the risk assessment process and include restrictions on retreatment intervals. Cheminova's current position is that this same language should be on the labels for all malathion products intended for wide-area public health mosquito control. These types of limitations are currently the topic of discussion with AMCA, IR-4 and RISE. We encourage EPA to open a dialogue with these groups on this subject.

Under integrated mosquito management practices, mosquito control districts are highly unlikely to apply the maximum application rate the maximum number of times, at the minimum interval. Mosquito control districts can be surveyed to identify the operational use rates for their adulticides. However, this would need to be an industry-wide effort and would likely require some time to develop.

Recommendation:
Given the generic need to define application practices and the use of adulticides both spatially and temporally, Cheminova recommends that a separate FOCUS meeting be arranged to include AMCA, IR-4, USDA, RISE, USAFPMB, and major adulticide registrants. We have begun contacting these groups in contemplation of a meeting in March.

EFED Question: Agricultural, uncultivated areas	**Summary Response** (also see full reply)
As noted above, OPP will utilize land cover data to spatially represent exposures on the landscape. OPP assumes that this use pattern would be applicable to the agricultural uses that will be modeled separately. Is this the registrants understanding of this use pattern, or are there other areas that this use pattern would cover?	Yes ***(see "use patterns," below)***
Can you provide a more detailed description of this use that would allow us to better define the use pattern spatially and can you identify other areas covered by this use?	Yes ***(see "use description," below)***

Cheminova response:

Use patterns:

Agreed, this use pattern would be applicable to the agricultural or commercial uses that will be modeled separately. It is not a separate use pattern.

Use description:

For label clarifications, see Table 1, Use 2. In the 1988 Registration Standard for malathion, this use appears on pages 250 and 251 under the "Non-crop, Wide area and General Indoor/Outdoor Treatment" category. The use site included barrier strips, ditch banks, non-crop areas, and wastelands. Listed target pests were the beet leafhopper, black grass bug, and grasshoppers. With the possible exceptions of public health mosquito control, exotic fruit fly quarantine/suppression, USDA Grasshopper and Mormon Cricket Suppression, and curly beet leafhopper control programs, this use is related to labeled agricultural use sites.

Recommendation:

With the possible exceptions of public health mosquito control, exotic fruit fly quarantine/suppression, USDA Grasshopper and Mormon Cricket Suppression, and curly beet leafhopper control programs, this use is related to labeled agricultural use sites. Thus, it should not be considered a unique use site.

EFED Question: Christmas Tree Plantations	**Summary Response** (also see full reply)
Our data indicates that Christmas tree production occurs in all 50 states and without further information we will assume this use occurs in all states. However, because OPP desires to make the risk assessment as spatially explicit as possible, do you have specific geographic information showing where this use is typically applied that would allow OPP to refine this assumption?	Yes ***(see "geographic information," below)***
Can you provide a more detailed description of this use that would allow us to better define the use pattern spatially and can you identify other areas covered by this use?	Yes ***(see "use pattern," below)***
Associating a use pattern with specific land cover classes is key to providing a spatially explicit risk assessment. Without specific information OPP will assume this use can be associated with multiple land cover classes (e.g. cultivated cropland, forestry, etc...). Are you aware of any information that would allow OPP to limit the association of this use with a single land cover class (e.g. cultivated cropland vs forestry)?	**Yes** ***(see "land cover classes," below)***

Cheminova response:

Use patterns:

For label clarifications to better describe this use, see Table 1, Use 3. Although Christmas trees are grown in all states, we are confident that malathion is not applied in all states. Information indicates that use is very limited; for example, in California, PUR data indicate that only one application was made in Monterey County, CA in 2012. USDA informs us that malathion is not recommended for use on Christmas trees in Michigan, and that no recent use has occurred in Oregon or Washington. Washington State Department of Agriculture confirms no use of malathion in Christmas trees in their September 2013 Registration Review Submittal to EFED (Appendix 1).

Land cover classes:

We note that EPA states in its question that in absence of more specific information, multiple land cover classes, including cultivated cropland and forestry, will be used to characterize the Christmas tree use site. This is an incorrect selection of land cover classes. Cheminova requests that EPA review their use of "forestry" as a use "site." We note that Christmas tree plantations are a crop site in USDA's Cropland Data Layer (CDL) and Agricultural Census data, not a use site that falls into a "forestry" use pattern. The USDA CDL code is 70, "Other Trees" and EPA's preliminary crosswalk for this category assigns it a unique value (75) under orchards. Tree plantations are also listed as non-food crop sites in EPA's pesticide use site tables. There are no use sites, per se, within EPA's "forestry" use pattern category.

As far as we are aware, EFED has grouped tree plantation CDL crop classes with "other trees" (reclass value 75) as noted above, not "forest" (reclass value 140). It is not clear if EFED's comments here reflect that status. Tree plantations have distinctive identity and perhaps EFED is failing to notice this use is treated as a non-food crop use, not a forestry use. Thus, any land cover representing "forestry" as a use pattern is not appropriate to use for plantation trees, which are a use site under non-food crop uses.

Additionally, the Federal Endangered Species Task Force (FESTF), of which Cheminova is a member, is examining the manner in which Christmas tree and certain other non-food or non-crop uses can be addressed spatially. In doing so they have learned from selected spot checks in Washington counties that the CDL layer appropriate for Christmas trees greatly overstates the actual location of Christmas tree farms or plantations when compared to the underlying base map and to National Christmas Tree Association "Treefinder" results for the areas examined. Furthermore, CDL Christmas trees and the National Land Cover Database (NLCD) forests are mutually exclusive. There is slightly more overlap between CDL Christmas trees and NLCD cultivated crops, but for the most part the NLCD classes underlying CDL Christmas tree locations are varied. It does not appear that Christmas trees were grouped as any one thing in the NLCD. Cheminova believes that any significant Christmas tree grower with active pest control programs would likely be a member of the National Christmas Tree Association and thus depicted on the "Treefinder" site of their webpage (http://www.realchristmastrees.org/dnn/AllAboutTrees/TreeLocator.aspx). These data appear to be a more realistic portrayal of Christmas tree farm locations.

Recommendation:

Given the uncertainty of USDA spatial data for "Christmas trees" as a land cover, Cheminova recommends the use of National Christmas Tree Association location data as the currently best available information for this use site.

EFED Question: Cull Piles	Summary Response (also see full reply)
Certain uses, if they occur in the same area as other assessed uses, may not add much exposure to uses that are more widely applied (i.e. agricultural crops). Does this use occur in the same agricultural areas as the malathion registered crop areas?	Yes ***(see "use areas," below)***
OPP assumes this use is applied as a spot treatment. Can the registrant confirm this and if so, are you aware of information on what is a typical area applied as a percentage of an acre?	Yes ***(see "use pattern," below)***

Cheminova response:

Use areas:
For label clarifications to better describe this use, see Table 1, Use 4. Note that Cheminova is not supporting this use during registration review. According to page 286 of the 1988 Registration Standard for malathion, the use of malathion for cull fruit and vegetable dumps is associated with a use site identified as "Agricultural Premises and Equipment". Thus, we believe this use would be associated with other use sites that are already being assessed.

Use pattern:
For label clarifications to better describe this use, see Table 1, Use 4. Note that Cheminova is not supporting this use during registration review. However, it is also Cheminova's understanding that this use is a spot treatment, as are all homeowner, and fence and hedge row treatments.

Recommendation:
This use is not supported by Cheminova and should not be included in EFED's risk assessment on malathion.

EFED Question: Drainage Systems	Summary Response (also see full reply)
OPP assumes that this use site relates to storm sewers but lacks information to confirm this. Can the registrant describe how malathion is typically applied to this use site?	Yes ***(see "use sites," below)***
If it is applied more broadly and includes surface water drainage systems, is this use likely in areas where other applications of malathion also occur (e.g. mosquito adulticide use) and therefore the same as the wide area – public health use?	Yes ***(see "use pattern," below)***

Cheminova response:

Use sites:
For label clarifications to better describe this use, see Table 1, Use 19. Note that Cheminova is not supporting this use during registration review. This use was cancelled by Cheminova as noted in the 2009 Registration Eligibility Decision (RED) (p. viii). We were not able to identify any current labels that include "drainage systems" as a use site. We request that EPA identify any relevant labels that they may be relying upon to describe this use.

Cheminova believes this use was related to certain aquatic non-food use sites that are mentioned on pages 264-267 of the 1988 Registration Standard for malathion. Specifically, the standard lists the following uses:

- *Irrigation Systems*
  - *Target pests were mosquito adults and larvae*
  - *Use site was inside irrigation pipes*
- *Sewage Systems*
  - *Target pest was Moth fly larvae*
  - *Use site was inside sewage system pipes*

This use site includes intermittently flooded areas, irrigation systems, and sewage systems.

Use pattern:
For label clarifications to better describe this use, see Table 1, Use 4. Note that Cheminova is not supporting this use during registration review. The target pests for these uses are generally mosquito larvae and moth fly larvae. Cheminova does not support larvicide uses and has urged the Agency to remove these uses from malathion labels. Cheminova notes that we did not submit any efficacy data to support larvicide uses in response to a recent data call-in (DCI) and we are not aware of any other registrant that has done so either. Furthermore, Cheminova submitted a letter to EPA in March of 2008 requesting cancellation of all sewage system uses. Thus, the Agency should remove the larvicide uses from labels.

Recommendation:
This use is not supported by Cheminova and should not be included in EFED's risk assessment. Cheminova advises that EPA consider how removing aquatic non-food use sites may impact the adulticide uses of malathion. Removing use sites should not impact the ability of states or Mosquito Control Districtsto use malathion to protect public health from adult mosquitoes, biting flies and midges.

EFED Question: Fence Rows/Hedge Rows	Summary Response (also see full reply)
This use represents a site that is difficult to assess quantitatively. Converting the application rate to a lbs ai per acre application rate and making associations with land cover classes may not be possible.	For homeowner uses, conversion to lbs/acre is inappropriate ***(see "use pattern," below)***
Can the registrant describe how malathion is applied to this use site (e.g. spot treatments) and whether the use is typically in areas where other malathion use occurs (e.g. agricultural land cover)?	Yes ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better describe this use, see Table 1, Use 5. Cheminova believes that this treatment is applicable to both agricultural uses as well as to homeowner residential uses. For agricultural uses, the application would be associated with the target crop and pest of concern, specifically with the cotton Boll Weevil Eradication Program (BWEP) and/or Beet Leafhopper Suppression Program. For example, there were 2 applications for beet curly top virus control in Calaveras and Kings Counties, CA in 2012. For homeowner uses, it is not possible or appropriate to convert this application rate in to lbs. ai/A so we have engaged RISE to further consider this issue.

For the product 67760-119, all non-agricultural uses, including the fencerow/hedgerow use, are labeled "Not for Residential Use." It is correct that dilution instructions are not provided, but dilution instructions are not specifically provided for most agricultural and commercial uses on labels. As noted above, it would be expected that the use on this label is associated with specific target pests and use sites, not the fence or hedgerow itself.

For the product 67760-40, the label directions for flies on home foundations and fence/hedgerows call for "Straight sprays: 5 tablespoons+1 gallon water or 1 cup + 2 1/2 gallon water or 1 quart + 12 gallon water." Based on one quart of product in 12 gallons of water, the dilution rate is 1:48 or 1 part product in 49 parts of finished spray. At that labeled dilution rate, 1 quart of product (=1.25 lb. ai) in 12 gallons of water means that there is 0.102 lb. ai/gallon of finished spray. Up to 2 gallons may be applied per 1000 sq. ft.; thus the maximum rate is 0.2 lb. ai/1000 sq. ft.

Please note that there are TWO fence/hedgerow use sites on the 67760-40 label. The first is listed with ornamentals and other commercial, non-agricultural use sites. The associated directions for use provide a specific use rate in lb. ai/1000 sq. ft., and it is the same rate as the 66760-119 label. The second reference is for fly use on home foundations and fence/hedgerows, and, as

described above, it provides a dilution rate and rate for applying finished sprays, the combination of which is used to calculate an application rate in lb. ai/A.

Both labels provide rate information on home foundations (67760-40 only) and fencerows that is at or below the rates specified in the RED. It is acknowledged that the RED provides the same rates for solid waste and refuse sites, presumably garbage cans and container.

Recommendation:
This should not be considered a unique use site. It is either associated with a homeowner, residential/commercial landscape use, an agricultural crop, suppression or eradications programs, or public health mosquito control.

EFED Question: Grain/Cereal/Flour bins and elevators (empty) and Greenhouse (empty)	**Summary Response** (also see full reply)
OPP typically assumes that indoor uses do not result in outdoor exposures. However, some uses can yield exposure to surface water bodies via a down-the-drain exposure. OPP assumes the bin and elevator uses do not have the potential for outdoor exposure however, greenhouse uses can sometimes result in outdoor exposure. Can the registrant provide any information on these uses to confirm OPP's assumption about the bins and elevators . . .	This is an indoor use without potential for surface water entry ***(see "bins and elevators," below)***
. . . and describe the greenhouse use in more detail?	This use is cancelled ***(see "greenhouses," below)***

Cheminova response:

Bins and elevators:
For label clarifications to better describe this use, see Table 1, Uses 6 and 7. All applications are made to inside surfaces or stored grain only. There is no potential for this use pattern to cause outdoor exposure.

Greenhouses:
Cheminova notes that it requested cancellation of all greenhouse uses of malathion in March of 2008 and that EPA has accepted that cancellation request. Thus, this use should no longer be on any end-use labels.

Recommendation:
Bin and elevator use patterns should be considered an indoor use with no potential for outdoor exposure. Greenhouse uses should not be on any end use labels.

EFED Question: Household and domestic dwellings (perimter use only)	Summary Response (also see full reply)
Recent information has shown that surface water exposures in urban streams have been associated with applications to the perimeter of buildings. For malathion, OPP has tools to estimate exposure from this use pattern but would like to know if there is specific information on how malathion is typically applied in these settings. Specifically, OPP would like to know if the registrant has information on typical application practices including how wide a perimeter treatment is typically made, how far up the side of a structure applications are made, whether applications may be made to impervious surfaces, and any information that would allow OPP to estimate what percentage of a typical lot would be treated?	Yes ***(see "Perimeter sprays," below)***

Cheminova response:

Perimeter sprays:
For label clarifications to better describe this use, see Table 1, Use 8. The additional label language will provide limitations to the width and height of a treated area as well as the number applications per year and interval of reapplications. Furthermore, Cheminova provided additional qualification of perimeter treatments in MRID 45457301 as follows:

> *". . . the National Association of Home Builders indicates the average size of new homes built in 1999 to be 2,250 ft^2 (www.nahb.org/facts/forecasts/sf.html). If the typical house is assumed to be one story and if the aspect ratio of width to depth is 2 to 1, a house of 2,250 ft^2 would have a perimeter of approximately 200 linear feet."*

Recommendation:
Label language revisions adequately quantify how the application may be made and can be used to estimate what percentage of a typical lot would be treated.

EFED Question: Mosquito treatment to house foundations and landscaping	Summary Response (also see full reply)
Can the registrant provide information to characterize how malathion is typically applied to this use site?	Yes ***(see "application pattern," below)***
What characterization can be provided for the extent and amount of malathion usage within urban, suburban, and rural areas?	No comprehensive national data are available at this time ***(see "areas treated," below)***

Cheminova response:

Application pattern:
For label clarifications to better describe these uses, see Table 1, Use 8 and 12-15 and the discussion immediately above on perimeter sprays.

Areas treated:
While this question is asked regarding malathion, it is a generic question relevant to all mosquito adulticides. Please refer to the discussion of mosquitocide uses with respect to areas and timing of use on page 7.

Recommendation:
This use can be addressed by referring to specific label directions for perimeter treatments and spot treatments to ornamentals.

EFED Question: Intermittently flooded areas	**Summary Response** (also see full reply)
Does this use site pertain to the mosquito adulticide use and therefore the same as the wide area – public health use?	No[1] ***(see "use pattern," below)***
Can the intermittently flooded area be an impervious surface?	No[1] ***(see "areas treated," below)***
Would this use pattern be considered a wetland?	No[1] ***(see "wetlands," below)***

[1]Flood irrigated crops, intermittently flooded areas, and wetlands may be *exposed* to malathion when it is applied to the air column as an adulticide, but these areas are not a "use site" *per se.*

Cheminova response:

Use pattern:
For label clarifications to better describe these uses, see Table 1, Use 19. The term "intermittently flooded areas" appears on our label only as related to the rice, wild rice and watercress uses, which are aquatic food use sites.

Areas treated:
Cheminova believes this use was related to certain aquatic non-food use sites that are mentioned on pages 264-266 of the 1988 Registration Standard for malathion (the aquatic non-food use sites include intermittently flooded areas, irrigation systems, and sewage systems). The target pests for these uses are generally mosquito larvae and moth fly larvae. According to the 1988 Registration Standard, this use was originally on labels for mosquito larvae control. Cheminova does not support larvicide uses for malathion. These areas could be associated with adulticide

uses, and as we note above any change related to larvicide uses should not adversely impact adulticide uses and the protection of public health.

Cheminova does not support applications of malathion for mosquito larvicide uses and has urged the Agency to remove these uses from malathion labels. Cheminova notes that we did not submit any efficacy data to support larvicide uses in response to a recent DCI and we are not aware of any other registrant that has done so either. Thus, the Agency should remove the larvicide uses from labels.

Wetlands:
While malathion is not typically made to aquatic non-food use sites such as wetlands, for some rare situations, especially after a natural disaster such as a major flood or a hurricane, wide area adult mosquito applications may need to be made to non-typical areas in order to protect public health. Such applications are only made when a public health emergency has been declared and are made to the air column rather than directly to water.

Recommendation:

This use pattern should be represented by rice, wild rice and watercress because it is exclusively associated with them. Direct treatment to aquatic sites for larvicide control is no longer supported by Cheminova and should be removed from all end use labels. Adulticide applications can occur to the air column above these areas in some circumstances.

EFED Question: Non-agricultural outdoor building structures	**Summary Response** (also see full reply)
OPP assumes this use represents a perimeter treatment and will assess similar to Household/domestic dwellings use site discussed above. Is this an accurate assumption for this use? If not, can the registrant clarify this use pattern?	Yes, this is a perimeter treatment ***(see "use pattern," below)***

Cheminova response:

Use pattern:
Cheminova agrees that this is a perimeter treatment as described by EPA. For label clarifications to better define this use, see Table 1, Use 8.

Recommendation:
Note label clarifications and treat as perimeter use.

EFED Question: Non-agricultural rights-of-way/fencerows	Summary Response (also see full reply)
How large / wide is a typical right of way? Is this a broadcast application covering the full width of the right of way or is only a portion of the right of way treated? What area is treated in any given application? How often are repeat applications made? Rights-of-way are typically defined as roads, railways, or utilities (power transmission, pipelines). Does this definition fit within the intended label uses? For each right of way type, are applications made by aerial, ground, or some other application type?	These are not malathion-specific questions ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 10. See also discussion under fencerows and hedgerows. Because these questions are not chemical-specific, we have asked for help from RISE to consider the question and develop a generic response. However, it should be noted that for malathion, this is not a unique non-agricultural site. It is either associated with a homeowner, residential/commercial landscape use, an agricultural crop, suppression or eradications programs, or public health mosquito control.

Recommendation:

This should not be considered a unique non-agricultural site. It is either associated with a homeowner, residential/commercial landscape use, an agricultural crop, suppression or eradications programs, or public health mosquito control.

EFED Question: Non-agricultural uncultivated areas/soil	Summary Response (also see full reply)
Are there typical use sites for this use pattern aside from NRCS, BLM, or Forest Service lands?	Possibly ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 11. It should be noted that for malathion, this is not a unique non-agricultural site. It is either associated with an agricultural crop, suppression or eradications programs, or public health mosquito control.

Recommendation:

This should not be considered a unique use site. It is either associated with an agricultural crop, suppression or eradications programs, or public health mosquito control.

EFED Question: Ornamental and/or shade trees, herbaceous plants, non-flowering plants, and woody shrubs and vines	Summary Response (also see full reply)
OPP will assume that these treatments can be made to both commercial nurseries and landscape uses (both residential and building/facility landscapes)?	Yes ***(see "use pattern," below)***
Does the registrant have any information on how these applications are made (e.g. spot treatments) that would limit them spatially?	Yes ***(see "application methods," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Uses 12-15. Cheminova agrees that these treatments are relevant to commercial nurseries and landscape uses, but that there are also homeowner uses.

Application methods:
In a residential/building/facility landscape, the applications are made to individual trees, shrubs, or to garden beds and to hedgerows so we believe that would be considered a spot treatment. Application equipment is hand-held pump sprayer or hose-end sprayer.

For commercial nurseries, we requested help from USDA to conduct a survey to determine what type of application equipment is used, and we have surveyed our customers to determine how these uses are employed. Depending on the size of the operation, applications may be made with handheld equipment, ground booms and airblast equipment. Surveys generally indicated that aerial applications were not important but 3 instances were reported in California in 2012. Note that our label clarifications in Table 1 limit commercial nursery use to ground applications only.

Recommendation:
Residential and landscape treatments should be considered as spot treatments. EPA should note that commercial nursery treatments are limited to ground only and restrictions on the number and interval of retreatments.

EFED Question: Pine seed orchards	**Summary Response** (also see full reply)
Is malathion applied to this this use site by commercial forestry companies as well as the U.S. Forest Service?	Yes ***(see "use pattern," below)***
OPP believes these uses are limited to forestry settings only and thus can be mapped as such. Does the registrant have information indicating that this use is limited to forested lands and not associated with agricultural orchards?	Yes, but not as "forestry settings" ***(see "application sites," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 16. Both the Forest Service and timber production and harvest companies maintain seed plantations, but as pointed out previously, such sites should not be labeled as "forest" land cover. USDA Forest Service advises us that malathion is occasionally used for thrips control in seedling production. Cheminova is only supporting this use as it relates to the needs of the U.S. Forest Service. We recommend that EPA consult with the US Forest Service about this use. Our understanding of the use is as follows:

- *Target pest = slash pine flower thrips*
- *Use is primarily in Southeastern US (specifically, southeast Texas and southwest Louisiana)*
- *Slash pine orchards are few in number and the total acres of orchard are small (less than 1000 acres)*

Application sites:
The use site is "tree plantations," not commercial forests. This is an agricultural non-food crop and the appropriate land cover to represent it is tree plantations, not "forestry." Use of forest land classes for spatial extent is not appropriate. It is more appropriate to use CDL tree plantation land cover classifications. FESTF is determining how spatial data best portrays this

use. Because this question is not chemical-specific, we have asked for help from RISE to consider the question and develop a generic response. Cheminova also has asked USDA for help to address these questions.

Recommendation:
The location for these treatments should be considered as limited to USDA Forest Services lands and any slash pine seed plantations on them, thus can be spatially limited by geography, federal land classification and CDL tree plantation categories.

EFED Question: Solid Waste Sites and Containers	**Summary Response** (also see full reply)
Are these uses restricted to inside dumpsters and the like, or is spraying on the exterior to the ground surface allowed?	Ground spraying is limited ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 17 and 18. This is a spot treatment use that is limited to areas in and immediately around garbage cans and dumpsters. Ground surface spraying is limited and the higher use rates are limited to unpainted or porous surfaces only.

Recommendation:
This should be considered a spot treatment limited to areas immediately in and around garbage containers and the area in which they are stored.

EFED Question: Swamps/marshes/stagnant water	**Summary Response** (also see full reply)
OPP assumes that this use site is similar to the wide area public health use and does not represent a separate use. Is this the registrants understanding of this use pattern?	Yes ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 19 and 20. Cheminova agrees with OPP that this use is only relevant to the wide area public health use (see discussions above).

Note that Cheminova only supports adulticide uses for malathion. Several labels still contain larvicide uses. Cheminova does not support applications of malathion for mosquito larvicide uses and has urged the Agency to remove these uses from malathion labels. Cheminova notes that we did not submit any efficacy data to support larvicide uses in response to a recent DCI and we are not aware of any other registrant that has done so either. Thus, the Agency should remove the larvicide uses from labels.

Recommendation:
Consider this as a wide area public health use, for adulticide treatments only.

EFED Question: Adult flies	**Summary Response** (also see full reply)
Applications are prescribed for where flies congregate and distinguished by painted and unpainted surfaces. Would applications to impervious surfaces receive the higher unpainted application rate?	Yes ***(see "use pattern," below)***

Cheminova response:

Use pattern:
For label clarifications to better define this use, see Table 1, Use 8. As far as Cheminova is aware, labels specify separate application rates to be used on painted and unpainted surfaces and that users will follow the labeled use directions (see perimeter discussions above). However, we recognize that impervious surfaces may be painted or unpainted so label clarification may be necessary.

Residual efficacy data show that porous surfaces, such as unpainted concrete, require the higher rate to be effective against adult flies (MRID 48984508). We are aware of similar data available in the public literature for mosquitoes where the WHO has evaluated the residual effectiveness of malathion and other products on wood, grass, mud, etc. used for housing in developing countries. It is thought that this is due to absorbance of the malathion into the substrate such that less material is bioavailable to the target pest. This is supported by fate data recently submitted by Cheminova that demonstrates very low recovery of malathion in wash solutions after applications to concrete (MRID 48986601).

Recommendation:
This use should be considered the same as that for household perimeter treatments.

Table 1. Malathion – Clarification of Non-agricultural Use Sites and Supported Use Directions for Registration Review (February 17, 2015)

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
1	Homeowner/residential fruit trees and vegetable gardens					Use not specifically listed in the non-ag section of the RED label table. However, this use is on many end-use labels meant for the homeowner/residential consumer. Cheminova is continuing to support this use for EC formulations containing 57 percent or less active ingredient. For the residential consumer market, Cheminova supports the fruit and vegetable use patterns listed in **Table 2**. In addition: • Maximum single application rate on the residential/homeowner labels must not exceed those permitted on the ag labels. • Application equipment limited to hand-pump sprayers, hose-end sprayers, and sprinkler cans. • No more than 2 applications per year
2	Agricultural, uncultivated areas	Non-ULV	1.0	lb. ai/A		Includes barrier strips, ditch banks, non-crop areas, roadsides and waste-lands. For malathion, this is not intended as a unique use site. It is associated with one or more of the following: • USDA Grasshopper/Mormon Cricket Suppression Program • CDFA Beet Leafhopper Suppression Program • Boll Weevil Eradication Program • Public Health Mosquito Control Refer to use patterns associated with these programs.
		ULV	0.1875			

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
3	Christmas tree plantations	Non-ULV	3.2	lb. ai/A	Maximum of 2 applications per year. 12-h restricted reentry interval.	Cheminova is only supporting ground based applications for this non-food agricultural use site. There are two uses related to this use site; nurseries and plantations. A plantation is a place where seedlings are planted and grown until harvest. A nursery is a place where seedlings are grown from seed before harvesting for transplant. Only EC products are used. **Plantation:** • Maximum single application rate is 3.2 lbs. ai/A • No more than 2 applications per year made using ground application equipment. **Nursery:** • Maximum single application rate is 1.5 lbs. ai/A • No more than 2 application per year made using ground application equipment • Minimum 7-day retreatment interval
		ULV	0.9375			
4	Cull piles	Non-ULV	6.857	Lb. ai/1000 ft^2	Drench	Cheminova does not intend to support this use for registration review.
5	Fencerows/ hedgerows	Non-ULV	0.2439	Lb. ai/1000 ft^2		• Maximum single application = 0.2439 lb./1000 ft^2 • Use a spray volume of 2 to 5 gallons per 1000 ft^2. • No more than 4 application per year • Ground application equipment only • Minimum 7-day retreatment interval

<table>
<tr><th>Use #</th><th>Site</th><th>Form</th><th>Maximum single application rate</th><th>Unit</th><th>Use Pattern Limitations per RED</th><th>Cheminova's Label Clarifications for Registration Review</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Grain/cereal/flour bins (empty)</td><td>Non-ULV</td><td>0.4762</td><td>Lb. ai/1000 ft^2</td><td rowspan="2">Contact or surface treatment</td><td rowspan="3">It is our understanding that the grain/cereal/flour bin and flour elevator uses are all indoor uses. For this use, bins are cleaned and then the walls and floor are sprayed with an EC formulation to rid the surfaces from stored grain insect pests. After the surfaces have dried, the grain crops are loaded into the bins. During loading of the bins, a dust formulation may be added to the grain as a protectant. After loading, a light dusting to the top layer of the grain in the bin can be done to "seal" the grain from any invading insects. Dusting to the top layer may be repeated at 60-day intervals depending on the length of storage. Specifically:

• A malathion EC product is applied once to all surfaces after the silos/storage bins/elevators have been cleaned. The purpose is to rid these structures of existing grain pests.

• A dust formulation is added to the grain as it is augured into the structures for storage (rate given in lbs. ai/1000 bushels). After loading is complete, dust is added to the top layer of the grain to seal out invading pests (rate given in lbs. ai/1000 ft^2). This top dressing may be repeated 60-day after filling.

As an example, our magnitude of the residue data supporting this use covered the following use pattern:

<table><tr><th>Appl. No</th><th>Test Substance Formulation</th><th>Target Application Rate</th><th>Application Timing</th></tr><tr><td>1</td><td>57 EC</td><td>8 pints/25 gallons water
Apply 3.0 gal/1000 ft^2
(0.6 lb ai/1000 ft^2)
(293 g ai/100 m^2)</td><td>Thoroughly spray the floor and walls of bins prior to filling the bins with wheat.</td></tr></table></td></tr>
<tr><td>Non-ULV</td><td>5</td><td>Lb. ai/25 gal</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Grain/cereal/flour elevators (empty)</td><td>EC (non-ULV)</td><td>0.6</td><td>Lb. ai/1000 ft^2</td><td rowspan="2">Contact or surface treatment</td></tr>
<tr><td>Dust</td><td colspan="2">See clarification to the right in last column.</td></tr>
</table>

<table>
<tr><th>Use #</th><th>Site</th><th>Form</th><th>Maximum single application rate</th><th>Unit</th><th>Use Pattern Limitations per RED</th><th>Cheminova's Label Clarifications for Registration Review</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>2</td><td rowspan="3">Big 6® Grain Protector (6% Dust)</td><td>10.4 lb. product/1000 bushels
(0.62 lb. ai/1000 bushels)
(10.3 g ai/metric ton)</td><td>Apply to the grain during transfer into the storage bin.</td></tr>
<tr><td>3</td><td>5.2 lb product/1000 ft^2
(0.31 lb ai/1000 ft^2)
(151 g ai/100 m^2)</td><td>Apply to the top of the grain in the storage bin immediately after filling.</td></tr>
<tr><td>4</td><td>5.2 lb product/1000 ft^2
(0.31 lb ai/1000 ft^2)
(151 g ai/100 m^2)</td><td>Apply to the top of the grain in the storage bin 60 days after filling.</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Household/domestic dwellings (perimeter outdoor only)</td><td>Non-ULV</td><td>0.2439</td><td>Lb. ai/1000 ft^2</td><td>Spray turf, soil, mulch and foliage within a 2 foot band around the perimeter of buildings and up to 2 feet on wall surfaces.</td><td>Use directions:
Outdoor use only.
Mix 0.1220 – 0.2439 lb. ai/1000 ft^2
Use a spray volume of 2 to 5 gallons per 1000 ft^2
Spray turf, soil, mulch and foliage within a 2 foot band around the perimeter of buildings and up to 2 feet on wall surfaces.
Use higher rate for unpainted or porous surfaces.
If mulch or debris is present, the higher spray volume may be needed to ensure adequate coverage.
Other than applications to building foundations, all outdoor applications to impervious surfaces such as sidewalks, driveways, patios, porches, are limited to spot, crack, and crevice applications only.
Make no more than 4 applications per year
Minimum reapplication interval is 7-days</td></tr>
</table>

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
9	Intermittently flooded areas	Non-ULV	0.5078	lb. ai/A		According to the 1988 Registration Standard, this use was originally on label for mosquito larvae control. Cheminova does not support larvicide uses of malathion for mosquito control. This use site could be associated with wide-area public health mosquito adulticide uses which are supported by Cheminova, the maximum application rates for which are outlined later in this table. Intermittently flooded areas are also associated with ag uses on rice and watercress which are supported by Cheminova. Refer to ag use patterns for rice and watercress.
		ULV	0.232			
10	Non-agricultural rights-of-way/fencerows	ULV	0.9281	lb. ai/A		For malathion, this is not intended as a unique non-ag use site. It is associated with an ag crop and/or the following: • USDA Grasshopper/Mormon Cricket Suppression Program • CDFA Beet Leafhopper Suppression Program • Boll Weevil Eradication Program • Public Health Mosquito Control. Refer to use patterns used in these programs.
11	Non-agricultural uncultivated areas/soil	Non-ULV	0.6	lb. ai/A		For malathion, this is not intended as a unique non-ag use site. It is associated with an ag crop and/or one or more of the following: • USDA Grasshopper/Mormon Cricket Suppression Program • CDFA Beet Leafhopper Suppression Program • Boll Weevil Eradication Program • Public Health Mosquito Control. Refer to use patterns used in these programs.
		ULV	0.9281			
12	Ornamental and/or shade trees	Non-ULV	2.5	Lb. ai/100 gal	Maximum of 2 applications per year. 10 day minimum retreatment interval. 12-h	**Homeowner/Residential Use** • Spot treatment only. • Maximum of 2 applications per year. • 10-day minimum retreatment interval. • 12-h restricted reentry interval. **Commercial Nursery Use** • Ground applications only. • Maximum of 2 applications per year.

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
					restricted reentry interval.	• 10-day minimum retreatment interval. • 12-h restricted reentry interval.
13	Ornamental herbaceous plants	Non-ULV	2.5	Lb. ai/100 gal	12-h restricted reentry interval.	**Homeowner/Residential Use** • Spot treatment only. • Maximum of 2 applications per year. • 7-day minimum retreatment interval. • 12-h restricted reentry interval. **Commercial Nursery Use** • Ground applications only. • Maximum of 2 applications per growing cycle. • 10-day minimum retreatment interval. • 12-h restricted reentry interval.
14	Ornamental non-flowering plants	Non-ULV	2.5	Lb. ai/100 gal		**Homeowner/Residential Use** • Spot treatment only. • Maximum of 2 applications per year. • 7-day minimum retreatment interval. • 12-h restricted reentry interval. **Commercial Nursery Use** • Ground applications only. • Maximum of 2 applications per growing cycle. • 10-day minimum retreatment interval. • 12-h restricted reentry interval.
15	Ornamental woody shrubs and vines	Non-ULV	2.5	Lb. ai/100 gal	Maximum of 2 applications per year. 10 day	**Homeowner/Residential Use** • Spot treatment only. • Maximum of 2 applications per year. • 10-day minimum retreatment interval.

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
					minimum retreatment interval. 12-h restricted reentry interval.	• 12-h restricted reentry interval. **Commercial Nursery Use** • Ground applications only. • Maximum of 2 applications per year. • 10-day minimum retreatment interval. • 12-h restricted reentry interval.
16	Pine seed orchards	Non-ULV	3.2	lb. ai/A	Maximum of 2 applications per year/growing season. 7 day minimum retreatment interval. 12-h restricted reentry interval.	• Malathion may be used to control thrips during a brief period from January to mid-February – no applications made the remainder of the year. • Ground applications only. • Maximum single application is 1.5 lbs. ai/A • No more than 2 applications per year • Minimum 7-day retreatment interval.
		ULV	0.9375			
17	Refuse/solid waste containers (outdoors)	Non-ULV	0.2439	Lb. ai/1000 ft2		Spot treatment only – in garbage cans, dumpsters, and areas where these are stored around homes, institutions and businesses. • Mix 0.1220 – 0.2439 lb. ai/1000 ft^2 • Use higher rate only for unpainted or porous surfaces • Max of 2 applications per year • Minimum 7-day reapplication interval.
18	Refuse/solid waste sites (outdoors)	Non-ULV	0.2439	Lb. ai/1000 ft2		
19	Swamps/marshes/stagnant water	Non-ULV	0.5075	lb. ai/A		According to the 1988 Registration Standard, this use was originally on label for mosquito larvae control. Cheminova does not support larvicide uses of

Use #	Site	Form	Maximum single application rate	Unit	Use Pattern Limitations per RED	Cheminova's Label Clarifications for Registration Review
						malathion for mosquito control. This use site could be associated with wide-area public health mosquito adulticide uses which are supported by Cheminova, and the maximum application rates for which are outlined below.
20	Wide Area – Public Health Use	ULV	0.23	lb. ai/A	Label must comply with PR-Notice 2005-1, and additional requirements outlined in the Label Table.	**Aerial Applications** • Maximum single application rate is 0.23 lbs. ai/A **Ground (non-thermal fog) Applications** • Maximum single application rate is 0.06 lbs. ai/A **General Use Instructions (applicable to both aerial and ground applications) from label for Fyfanon ULV AG (EPA Reg. No.: 67760-34):** • Make treatments only when mosquitos are biting. • Do not retreat a site more than 3 times in any one week. However, more frequent treatments may be made to prevent or control a threat to public and/or animal health determined by the state, tribal or local health or vector control agency on the basis of documented evidence a disease causing agents in vector mosquitoes or the occurrence of mosquito-borne diseases in animal or human populations, or if specifically approved by the state or tribe during a natural disaster effort.

Table 2. Malathion – Homeowner Fruit and Vegetable Garden Use Patterns Supported In Registration Review (February 4, 2015)

USE SITE	MAX SINGLE APP RATE (LB AI/A)	Equivalent MAX FL OZ PRODUCT/1000 SQ FT (Use directions based on an EC product containing 4.37 lb. ai/gallon of product with one gallon of solution covering 1000 sq. ft.)	MAX # APPS PER YEAR	MINIMUM RE-APPLICATION INTERVAL (Days)
Apples	1.25	0.84	2	7
Apricots	1.5	1.01	2	7
Asparagus	1.25	0.84	2	7
Avocado	1.0	0.67	3	7
Beans	1.0	0.67	2	7
Beets	1.25	0.84	2	7
Blueberry	1.25	0.84	2	5
Broccoli	1.25	0.84	2	7
Brussels sprouts	1.25	0.84	2	7
Cabbage	1.25	0.84	2	7
Caneberries	2.0	1.34	2	7
Carrots	1.25	0.84	2	7
Cauliflower	1.25	0.84	2	7
Celery	1.5	1.01	2	7

USE SITE	MAX SINGLE APP RATE (LB AI/A)	Equivalent MAX FL OZ PRODUCT/1000 SQ FT (Use directions based on an EC product containing 4.37 lb. ai/gallon of product with one gallon of solution covering 1000 sq. ft.)	MAX # APPS PER YEAR	MINIMUM RE-APPLICATION INTERVAL (Days)
Cherries	1.75	1.17	2	3
Citrus	1.5	1.01	3	7
Collards	1.0	0.67	2	7
Corn (sweet and pop)	1.0	0.67	2	5
Cucumber	1.75	1.17	2	5
Dandelion	1.25	0.84	2	7
Eggplant	1.56	1.05	2	5
Endive	1.25	0.84	2	7
Garlic	1.56	1.05	2	7
Grapes	1.88	1.24	2	14
Kale	1.0	0.67	2	5
Kohlrabi	1.25	0.84	2	7
Kumquat	1.5	1.01	3	7
Leek	1.56	1.05	2	7
Lettuce	1.88	1.24	2	6
Mango	1.0	0,67	2	7

USE SITE	MAX SINGLE APP RATE (LB AI/A)	Equivalent MAX FL OZ PRODUCT/1000 SQ FT (Use directions based on an EC product containing 4.37 lb. ai/gallon of product with one gallon of solution covering 1000 sq. ft.)	MAX # APPS PER YEAR	MINIMUM RE-APPLICATION INTERVAL (Days)
Melons (except watermelon)	1.0	0.67	2	7
Mustard greens	1.0	0.67	2	7
Okra	1.25	0.84	2	7
Onions (bulb and green)	1.56	1.05	2	7
Parsley	1.5	1.01	2	7
Peaches	3.0	2.02	2	11
Pears	1.25	0.84	2	5
Peas	1.0	0.67	2	7
Peppers	1.56	1.05	2	5
Potatoes	1.56	1.05	2	7
Pumpkins	1.0	0.67	2	7
Radish	1.0	0.67	2	7
Rutabagas	1.0	0.67	2	7
Shallot	1.56	1.05	2	7
Spinach	1.0	0.67	2	7
Squash, summer	1.75	1.17	2	7

USE SITE	MAX SINGLE APP RATE (LB AI/A)	Equivalent MAX FL OZ PRODUCT/1000 SQ FT (Use directions based on an EC product containing 4.37 lb. ai/gallon of product with one gallon of solution covering 1000 sq. ft.)	MAX # APPS PER YEAR	MINIMUM RE-APPLICATION INTERVAL (Days)
Squash, winter	1.0	0.67	2	7
Strawberry	2.0	1.35 (For strawberries, use directions are based on an EC product containing 4.35 lb. ai/gallon of product with one gallon of solution covering 1000 sq. ft.)	2	7
Sweet potatoes	1.56	1.05	2	7
Swiss chard	1.0	0.67	2	7
Tomatoes	1.56	1.05	2	5
Turnips	1.25	0.84	2	5
Watercress	1.25	0.84	2	3
Watermelons	1.5	1.01	2	7

APPENDIX 1. WASHINGTON STATE DEPARTMENT OF AGRICULTURE MALATHION REGISTRATION REVIEW SUBMITTAL

STATE OF WASHINGTON

DEPARTMENT OF AGRICULTURE

P.O. Box 42560 • Olympia, Washington 98504-2560 • (360) 902-1800

MALATHION REGISTRATION REVIEW SUBMITTAL

September 2013

Pesticide Use Summary

Common Trade Names: Malathion

Use Type: insecticide

Chemical Class: organophosphate

CAS Number: 121-75-5

Washington State Use Practices – NASS Data[1]

Crop Name	2012 WSDA Crop Acres[2]	Application Date		Lbs AI per Acre		# of Apps		% Acres Treated		App. Method	Total Lbs AI Applied	
		Begin	End	Min	Max	Min	Max	Min	Max		Min	Max
Caneberry	13,321	07/01	07/31	1	1	1	1	36.9	36.9	ground	4,915	4,915
Cherry	44,063	06/01	07/31	1.22	1.24	1.1	2	0.8	0.9	ground	473	983

[1] This data has been supplied to WSDA by the USDA's National Agricultural Statistics Service (NASS). Each data point provided by NASS is a compilation of grower-provided data collected directly from pesticide use records.

[2] Crop acreage is derived from the Washington State Department of Agriculture (WSDA) land use geo-database.

Washington State Use Practices – WSDA Data[1]

Crop Name	2012 WSDA Crop Acres[2]	Application Date		Lbs AI per Acre		# of Apps		% Acres Treated		App. Method	Total Lbs AI Applied	
		Begin	End	Min	Max	Min	Max	Min	Max		Min	Max
Alfalfa Seed	12,524	06/01	06/15	1.3	1.3	1	1	5	5	ground	797	797
Asparagus	5,744	07/15	09/15	1.0	1.0	2	2	10	10	ground	1,149	1,149
Blueberry[3]	9,309	07/15	09/15	2.0	2.0	4	5	100	100	aerial	74,472	93,090
Caneberry[3]	13,321	06/15	08/15	2.0	2.0	2	2	100	100	aerial	53,284	53,284
Onion	26,973	06/20	07/31	2.0	2.0	1	1	19	19	ground	10,250	10,250

[1] This data was collected by WSDA staff through phone interviews and meetings with growers. The data is a profile of "typical" pesticide use and supplements NASS data on minor crops in Washington State.

[2] Crop acreage is derived from the Washington State Department of Agriculture (WSDA) land use geo-database.

[3] This is supplemental data provided by growers in early 2013. Treatments are directly related to control of Spotted Wing Drosophila.

MALATHION USE SUMMARY
Washington State Department of Agriculture
September 5, 2013

Labeled crops that have been surveyed but have no reported malathion use in Washington State

Labeled Crop	Year surveyed	Acreage
Apple	2011	174,412
Carrot	2010	4,197
Christmas Tree	2008	9,532
Field Corn	2012	227,091
Sweet Corn	2010	60,984
Grape	2011	71,792
Grass Hay	2012	201,830
Mint	2010	26,626
Green Pea	2010	33,490
Pear	2011	22,304
Potato	2010	177,002
Strawberry	2010	1,493
Timothy	2012	115,752
Wheat	2010	2,341,652

Surface Water Monitoring Results (2003-2012)

In 2003, the Washington State Department of Agriculture began a comprehensive surface water monitoring program for pesticides in salmon-bearing waters. Samples are collected weekly for 26 weeks (March-Sept). There are currently seven actively monitored basins:

- Thornton Creek in the Cedar-Sammamish basin and Longfellow Creek in the Green-Duwamish basin, representing urban land use;
- Lower Skagit-Samish basin, representing western Washington Agriculture;
- Bertrand Creek in the Nooksack basin, representing berry agriculture (added in 2013);
- Lower Yakima basin, representing eastern Washington irrigated agriculture; and
- Wenatchee and Entiat basins, representing central Washington tree fruit agriculture.

The lab analysis includes more than 170 legacy chemicals, current use pesticides and degradates. Field measurements also collected at each site include water flow, temperature, DO, pH, conductivity, and total suspended solids.

Malathion has been monitored for in Washington's surface waters since the program began in 2003. Malathion has been detected 68 times out of a total of 3283 samples since inception of the monitoring program. 15 of those detections have exceeded a regulatory or aquatic life benchmark. Of those 15 exceedances, 6 were in excess of the federally established Endangered Species Level of Concern (ESLOC). The lower practical quantitation limit (LPQL) for chlorpyrifos from 2003-2012 was between 0.025 and 0.034 µg/l. All samples were analyzed by scientists at the Manchester Environmental Laboratory (Washington State Department of Ecology) on a GCMS using EPA method 8270M. Below are the malathion detections from 2003-2012.

MALATHION USE SUMMARY
Washington State Department of Agriculture
September 5, 2013

Year	Water body	WRIA	Maximum Value (µg/L)	# of Detections	# of Exceedances
2003	Marion Drain	37	0.024	3	0
2003	Sulphur Creek	37	0.02	1	0
2003	Spring Creek	37	0.076	1	1
2004	Marion Drain	37	3.05	6	2 (1-ESLOC)
2004	Sulphur Creek	37	0.024	4	0
2004	Spring Creek	37	0.03	7	0
2005	Marion Drain	37	0.23	10	2 (1-ESLOC)
2005	Sulphur Creek	37	0.028	3	0
2005	Spring Creek	37	0.033	1	0
2006	Marion Drain	37	0.024	4	0
2006	Spring Creek	37	0.017	2	0
2007	Marion Drain	37	0.082	6	1
2007	Sulphur Creek	37	0.021	2	0
2007	Spring Creek	37	0.016	1	0
2008	Marion Drain	37	0.015	2	0
2009	Indian Slough	3	0.9	1	1-ESLOC
2009	Dig Ditch (Upper)	3	0.94	1	1-ESLOC
2009	Marion Drain	37	0.045	2	0
2010	Marion Drain	37	0.062	2	1
2011	Marion Drain	37	0.27	3	2 (1-ESLOC)
2012	Marion Drain	37	0.067	3	2
2012	Sulphur Creek	37	0.58	2	1-ESLOC
2012	Spring Creek	37	0.11	1	1

Ground Water Monitoring Results (1990-2011)

WSDA maintains a database that contains information on ground water samples analyzed for pesticides in the last 30 years. From 1980 through 2010 there are records for 4910 ground water samples analyzed for the presence of malathion. Of those 4910 samples there have been 2 detections of malathion in Washington State groundwater.

Agency	Sample Date	Parameter Name	Value ug/L	Qualifier	Method Code	Lat_Dec	Long_Dec	Well Elevation	Well Depth
USGS	9/2/1994	Malathion	0.01		0-1126-95	47.1448	-122.9585	90	140
USGS	7/24/2002	Malathion	0.01		0-1126-95	46.3587	-119.1767	625	53

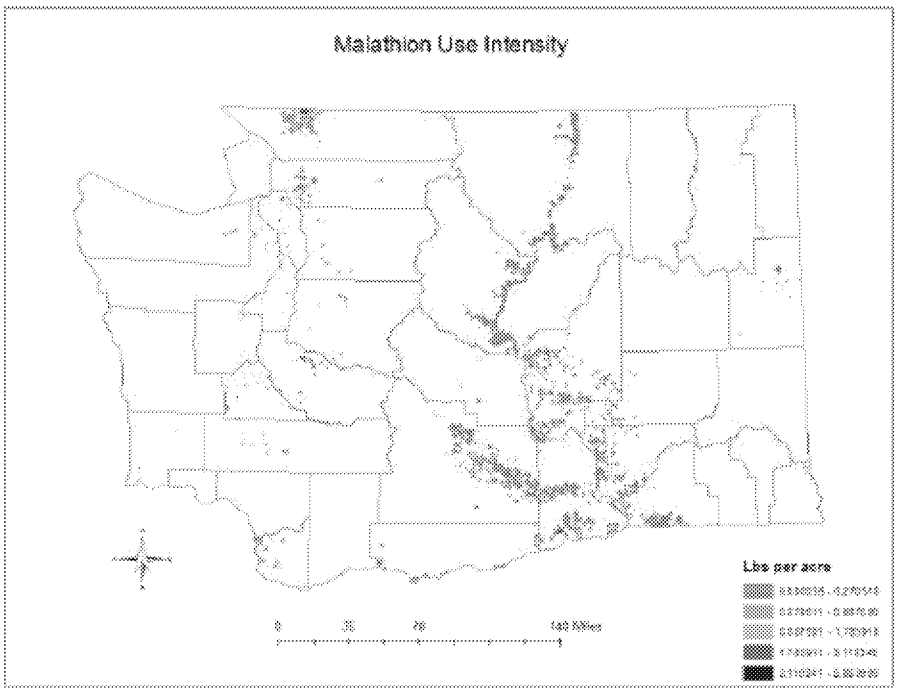
MALATHION USE SUMMARY
Washington State Department of Agriculture
September 5, 2013

Impaired Waterbodies

There are no waterbodies in Washington State currently categorized as Category 5 on the 303(d) list for insecticide malathion.

Use Intensity Map

The map below displays known pesticide use information at the section level in pounds of active ingredient per acre. All crops are combined to assess potential environmental loading per square mile. Although the directions for how this use intensity map was generated are not included in this document itself, they are available and have been provided.



References:

Database

- 2013 Washington State registered pesticide labels
- Washington State Department of Agriculture, NRAS Pesticide Use Database, June 2013.
- Washington State Department of Agriculture, Groundwater Pesticide Database, June 2013.
- Washington State Department of Agriculture, Agricultural Land Use Geodatabase, March 2013.

Meetings
- Washington State Alfalfa Seed Producers. December 15, 2005.
- Washington State Asparagus Commission. February 27, 2007.
- Washington State Berry Growers. January 22, 2013.
- Washington State Onion Producers. December 16, 2008.

Web sites
- Pesticide Information Center On Line (PICOL) – WSU/WSDA/ODA/OSU: http://cru66.cahe.wsu.edu/LabelTolerance.html
- Greenbook Product Directory: http://www.greenbook.net/
- U.S. Department of Agriculture National Agricultural Statistics Service - Agricultural Chemical Use Database: http://www.pestmanagement.info/nass/

Published Reports
- Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams 2003-2005 Triennial Report. Authored by Washington State Departments of Ecology and Agriculture. Publication No. 06-03-036.
- Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams 2006-2008 Triennial Report. Authored by Washington State Departments of Ecology and Agriculture. Publication No. 10-03-008.
- Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams 2009-2011 Triennial Report. Authored by Washington State Departments of Ecology and Agriculture. Publication No. AGR PUB 102-377
- Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams 2012 Report. Authored by Washington State Departments of Ecology and Agriculture. Publication No. AGR PUB 102-388

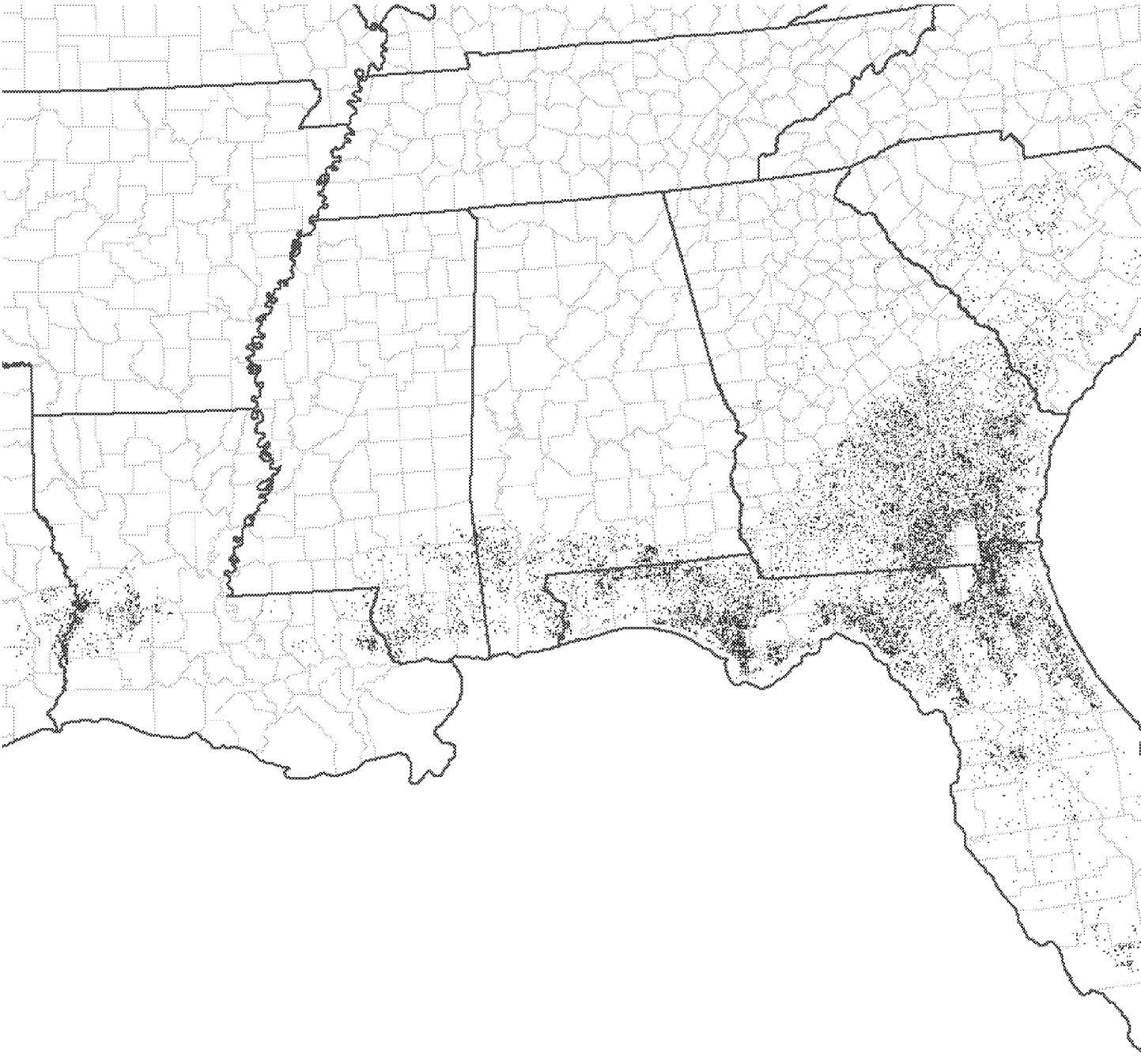
Contact Information:

Please feel free to contact the Natural Resource Assessment Section with any questions regarding this information:

Natural Resources Building
1111 Washington Street SE, 2nd Floor
PO Box 42560
Olympia, WA 98504-2560
Telephone: (360) 725-5768
Toll-free: (877) 301-4555, #6
Fax: (360) 902-2093
e-mail: nras@agr.wa.gov
http://agr.wa.gov/PestFert/natresources/

Finished running the potential pine seed orchard data. 8,843,791 acres.

I'll forward the data to Jen.



From: Eckel, William
Sent: Wednesday, October 28, 2015 11:01 AM
To: Lennartz, Steven <Lennartz.Steven@epa.gov>
Cc: Shelby, Andrew <Shelby.Andrew@epa.gov>
Subject: Re: Malathion Use in Souther PIne Seed Orchards

Let's talk about this

Sent from my iPhone

On Oct 28, 2015, at 11:00 AM, Lennartz, Steven <Lennartz.Steven@epa.gov> wrote:

Will do. Full disclosure, this will create way more acreage than the <1000ac figure, let alone the 25ac reported last year…

From: Shelby, Andrew
Sent: Wednesday, October 28, 2015 10:58 AM
To: Lennartz, Steven <Lennartz.Steven@epa.gov>; Eckel, William <Eckel.William@epa.gov>
Subject: RE: Malathion Use in Souther PIne Seed Orchards

No, I think we should be restricting to the layer of slash pine range given by the Forest Service. Memo with that range is attached. It sounds like you got a slash pine range layer. Hopefully the map in Figure 1 matches it.

From: Lennartz, Steven
Sent: Wednesday, October 28, 2015 10:55 AM
To: Eckel, William <Eckel.William@epa.gov>; Shelby, Andrew <Shelby.Andrew@epa.gov>
Subject: RE: Malathion Use in Souther PIne Seed Orchards

Are we restricting pine seed orchards to Bradford, Clay, and Alachua Counties in Florida, or MS, AL, GA, and FL?

I would be using our "managed forests" layer, along with the slash pine layer and excluding USFS lands.

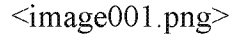
From: Eckel, William
Sent: Monday, October 26, 2015 4:41 PM
To: Shelby, Andrew <Shelby.Andrew@epa.gov>; Lennartz, Steven <Lennartz.Steven@epa.gov>
Subject: FW: Malathion Use in Souther PIne Seed Orchards

From: Mangini, Alex -FS [mailto:amangini@fs.fed.us]
Sent: Monday, October 26, 2015 4:40 PM
To: Chin, Teung <Teung.Chin@ARS.USDA.GOV>; Eckel, William <Eckel.William@epa.gov>; Frank, Michelle -FS <mfrank@fs.fed.us>; Covell, Stephen -FS <scovell@fs.fed.us>
Subject: RE: Malathion Use in Souther PIne Seed Orchards

Teung,

My contact informed me that most of the industry slash pine seed orchard managers have not used malathion for thrips control in about 10 years. The recent use was in north-central Florida – Bradford, Clay, and Alachua Counties. Exact name of the operations and locations is considered proprietary information and so I could not get it.

Hope this helps … Alex …



Alex C. Mangini
Entomologist

Forest Service
Southern Region, Forest Health Protection, Alexandria Field Office

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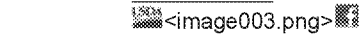


Caring for the land and serving people

From: Chin, Teung
Sent: Friday, October 23, 2015 10:09 AM
To: Eckel, William; Mangini, Alex -FS; Frank, Michelle -FS; Covell, Stephen -FS
Subject: RE: Malathion Use in Souther PIne Seed Orchards

Hi Bill:

We will try to pinpoint the estimated two private operations who are using it by COB Monday.

Thank you
Teung

Teung F. Chin, Ph.D.
USDA ARS Office of Pest Management Policy
1400 Independence Ave., S.W.
Room 3871 (Mail Stop 0314)
Washington DC, 20250
(202) 222-8619 cell
teung.chin@ars.usda.gov

From: Eckel, William [mailto:Eckel.William@epa.gov]
Sent: Friday, October 23, 2015 11:07 AM
To: Mangini, Alex -FS; Frank, Michelle -FS; Covell, Stephen -FS; Chin, Teung
Subject: RE: Malathion Use in Souther PIne Seed Orchards

Alex:

Thank you for your response! I appreciate the clarity it gives us.

Bill Eckel

From: Mangini, Alex -FS [mailto:amangini@fs.fed.us]
Sent: Friday, October 23, 2015 10:58 AM
To: Frank, Michelle -FS <mfrank@fs.fed.us>; Covell, Stephen -FS <scovell@fs.fed.us>; Chin, Teung <Teung.Chin@ARS.USDA.GOV>; Eckel, William <Eckel.William@epa.gov>
Subject: Malathion Use in Souther PIne Seed Orchards

Colleagues,

The USDA Forest Service, Southern Region **DOES NOT use malathion in any of its seed orchards**. It has not used malathion **for at least 20 years**. Cheminova is **INCORRECT** in stating that it is used in SE Texas and and SW Louisiana only. Malathion is still used by private companies in their slash pine seed orchards – primarily in south Alabama, south Georgia and Florida; however this use is very limited – about 25 acres per year.

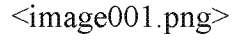
The USDA Forest Service has not consulted with USDI F&W or NOAA Fisheries on this because it stopped using malathion LONG BEFORE such consultations were conceived of.

Attached is a document summarizing malathion use in seed orchards and two message threads of some earlier interactions on this issue.

If necessary, I will **gladly** speak to a Cheminova representative to set them straight on malathion use in seed orchards.

If you have questions or need more information, give me a call.

Hope this helps … Alex …



Alex C. Mangini
Entomologist

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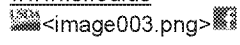


Caring for the land and serving people

From: Frank, Michelle -FS
Sent: Thursday, October 22, 2015 7:57 AM
To: Mangini, Alex -FS
Subject: FW: Question about pine seedling orchards

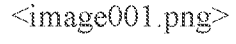
Alex,

I'm in Russellville giving a training session. Can you please provide Steve with some feedback and maybe talk to the Auburn coop?

From: Covell, Stephen -FS
Sent: Wednesday, October 21, 2015 2:48 PM
To: Frank, Michelle -FS
Cc: Chin, Teung
Subject: FW: Question about pine seedling orchards

Michele:
Inquiry below forwarded for your attention. Please respond directly to Bill Eckel (cc to me).

Thank you.
V/R
Steve



Stephen A. Covell
USFS National Pesticide-Use Coordinator

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Caring for the land and serving people

From: Eckel, William [mailto:Eckel.William@epa.gov]
Sent: Wednesday, October 21, 2015 2:19 PM
To: Covell, Stephen -FS
Subject: Question about pine seedling orchards

Hi Steve,

I have a question for you that came up during our risk assessment for malathion.

There is a labelled use for malathion for pine seedling orchards that is associated with the Forest Service.

We are trying to determine where this is taking place, and whether it is on USFS or private land, or both. The registrant, Cheminova, says it is in SE Texas and SW Louisiana.

Could you tell us which Forests, or counties the pine seedling orchards are in? And if it is on USFS land or also on private land?

Also, can you tell us whether USFS has consulted with the Fish & Wildlife Service or NOAA Fisheries on this?

Thanks!

Bill Eckel
Senior Science Advisor
US EPA Office of Pesticide Programs